

What is claimed is:

1. A process for dispersing a pigment for a paint, printing ink or pigment paste which comprises adding to the pigment co-polymer based on oxyalkyleneglycol-alkylenyl ethers and unsaturated dicarboxylic acid derivatives comprising:

a) from about 10-to about 90-mol% of structural groups of the formula

Ia and/or Ib

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10 where

M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

$$X =$$
 $-OM_a \text{ or } -O-(C_mH_{lm}O)_n-(C_mH_{lm}O)_o-R^1$,

15 where

R¹ = is H, an aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon, an aryl radical which is unsubstituted or substituted,

l = 1 or 2,

m = 2 to 18,

20 the index on the hydrogen atom being formed by the product of l and m, and

n = 0 to 100, and

o = 0 to 100,

$$R^2 = R^1$$
 or -CO-NH₂ and also

$$-Q^{1}N - Q^{2} - NQ^{3}Q^{4}$$
, where

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Q¹ is a hydrogen atom or a monovalent hydrocarbon radical;

 $\ensuremath{Q^3}$ and $\ensuremath{Q^4}$ are aliphatic and/or alicyclic alkyl radicals; and

unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$,

 $Y = O, NR^2, R^2$ being as defined above, or

b) from about 1 to about 89 mol% of structural groups of the formula IIa or IIb

$$-CH_{2} - CR^{3} -$$

$$| (CH_{2})_{p} - O - (C_{m}H_{1m}O)_{n} - (C_{m}H_{1m}O)_{o}-R^{1}$$
IIa

Ilb

in which

 $R^3 = H$, aliphatic hydrocarbon radical,

$$p = 0 \text{ to } 3$$
,

$$q = 0 \text{ to } 6, t = 0 \text{ to } 3, \text{ and }$$

R¹ and l, m, n and o are as defined above,

c) about 0.1 to about 10 mol% structural groups of the formula IIIa or IIIb

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where

$$R^4 = H, CH_3$$

$$S = -H, -COOM_a, -COOR^5$$

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where R^5 = aliphatic hydrocarbon radical,

cycloaliphatic hydrocarbon radical,

aryl radical

$$T = -U^{1}-O-(C_{m}H_{lm}O)_{n}-(C_{m}H_{lm}O)_{o}-R^{6}$$

where
$$l = 1$$
 or 2, $m = 2$ to 18, and

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$$n = 0$$
 to 100 and $o = 0$ to 100,

$$U^1 = -CO - NH-, -O-, -CH_2O-,$$

$$R^6 = R^1, -CH_2 - CH - U^2 - C = CH$$

| |

 R^4 R^4 S

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where $U^2 = -NH - CO -, -O -, -OCH_2, -W - R^7$, where

$$W = \begin{bmatrix} CH_3 \\ Si - O \end{bmatrix} \xrightarrow{CH_3} Si - \begin{bmatrix} CH_3 \\ Si - O \end{bmatrix} \xrightarrow{CH_3} CH_3$$

$$r = 2 \text{ to } 100$$

$$R^{7} = R^{1},$$

$$-\left[(CH_{2})_{3} - NH\right]_{S}^{-} = CO - C = CH$$

$$R^{4} \mid S$$

$$-\left((CH_{2})_{2} - O - CO - C = CH\right)_{R^{4}}^{-} \mid S$$

$$S = 1 \text{ or } 2$$

$$Z = 0 \text{ to } 4,$$

$$S = 15$$

$$-CO - \left[NH - (CH_{2})_{3}\right]_{S}^{-} = W - R^{7}$$

$$-CO - O - (CH_{2})_{Z} - W - R^{7}$$

$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1, \text{ where}$$
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$$V = -O - CO - C_6H_4 - CO - O - \text{or} - W -,$$

$$-COOR^{5}$$
 in the case of $S = -COOR^{5}$ or $COOM_{a}$,

and

$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above.

- 2. The method according to claim 1, wherein the copolymers comprise
 - a) from 10 to 90 mol% of structural groups of the formula Ia and/or Ib

-CH — CH — CH—CH—CH—CH—COM_a COX CO CO

where

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M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

 $X = -OM_a \text{ or } -O-(C_mH_{lm}O)_n-(C_mH_{lm}O)_o-R^1,$

where

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R¹ = is H, an aliphatic hydrocarbon radical having 1 to 20 carbon atoms, a cycloaliphatic hydrocarbon having 5 to 8 carbon atoms, an aryl radical having 6 to 14 carbon atoms which is unsubstituted or substituted,

l = 1 or 2,

m = 2 to 18,

the index on the hydrogen atom being formed by the product of l and m, and

n = 0 to 100, and

o = 0 to 100,

 $-NHR^2$ and/or $-NR_2^2$ where

$R^2 = R^1$ or $-CO-NH_2$ and also

$$-Q^{1}N - Q^{2} - NQ^{3}Q^{4}$$
, where

Q1 is a hydrogen atom or a monovalent hydrocarbon radical

having 1 to 24 carbon atoms,

Q² is a divalent alkylene radical having 2 to 24 carbon atoms,

Q³ and Q⁴ are aliphatic and/or alicyclic

alkyl radicals having 1 to 12 carbon atoms, and

unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$,

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 $Y = O, NR^2, R^2$ being as defined above, or $N-Q^2-NQ^3Q^+$

where

Q², Q³ and Q⁴ being as defined above,

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b) from 1 to 89 mol% of structural groups of the formula IIa or IIb

 $(CH_2)_p - O - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o - R^1$

IIa

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$$-CH_2 - CR^3 -$$

$$| \\ O - ((CH_2)_q - O)_t - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o - R^1$$

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Πb

in which

 $R^3 = H$, aliphatic hydrocarbon radical having 1 to 5 carbon atoms,

$$p = 0 \text{ to } 3,$$

$$q = 0 \text{ to } 6, t = 0 \text{ to } 3, \text{ and }$$

R¹ and l, m, n and o are as defined above,

c) 0.1 to 10 mol% structural groups of the formula IIIa or IIIb

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where

$$R^4 = H, CH_3$$

15 $S = -H, -COOM_a, -COOR^5$

where R^5 = aliphatic hydrocarbon radical having 3 to 20 carbon atoms, cycloaliphatic hydrocarbon radical having 5 to 8 carbon atoms, aryl radical having 6 to 14 carbon atoms

$$T = -U^{1}-O-(C_{m}H_{lm}O)_{n}-(C_{m}H_{lm}O)_{o}-R^{6}$$
 where $l=1$ or 2 , $m=2$ to 18 , and
$$n=0 \text{ to } 100 \text{ and } o=0 \text{ to } 100,$$

$$U^{1}=-CO-NH-,-O-,-CH_{2}O-,$$

$$R^6 = R^1$$
, $-CH_2 - CH - U^2 - C = CH$

$$R^4 \qquad R^4 \qquad S$$

where $U^2 = -NH - CO_{-}, -O_{-}, -OCH_2, -W - R^7$, where

W

$$\begin{bmatrix}
CH_3 \\
I \\
Si - O
\end{bmatrix}$$

$$CH_3 \\
Si - CH_3$$

$$CH_3$$

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r = 2 to 100

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$$R^7 = R^1$$
, $-[(CH_2)_3 - NH]_{s}^{-CO-C = CH}_{R^4}|_{S}^{-CO-C = CH}_{R^4}$

s = 1 or 2

z = 0 to 4,

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$$-\text{CO-}[\text{NH-}(\text{CH}_2)_3]_s$$
 W- R⁷

$$-CO - O - (CH_2)_z - W - R^7$$

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$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1$$
, where
$$V = -O - CO - C_6H_4 - CO - O - or - W -,$$

 $-COOR^{5}$ in the case of $S = -COOR^{5}$ or $COOM_{a}$,

and

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$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above;

- 3. The method according to claim 1, where, in the copolymers, up to about 50 mol%, based on the sum of a structural groups a), b) and c), of components, the monomers of which are vinyl, acrylic acid or methacrylic acid.
- 4. The method according to claim 1, where, in the copolymers, up to about 20 mol%, based on the sum of structural groups a), b) and c), of components, the monomers of which are vinyl, acrylic acid or methacrylic acid.
- 5. The method according to claim 1, where the copolymers comprise about 40 to about 55 mol% of a component of formula Ia and Ib; about 40 to about 55 mol% of a component of formula II; and from about 0.1 to about 5 mole% of a component of formula III or IIIb.
- 6. The method according to claim 1, where the copolymers comprise a component of structural formula Ia and/or Ib which is a dicarboxylic acid derivative containing at least one amino oxide group.
- 7. The method according to claim 1, where the copolymers comprise a component of structural formula IIIa and/or IIIb which are obtained by a process comprising vinyl-type polysiloxane compounds.
 - 8. A dispersed pigment obtained by the process according to claim 1.
- 9. A printing ink, paint or pigment paste which comprises a dispersed pigment according to claim 8.
 - 10. An aqueous pigment concentrate which comprises

25 – a pigment;

- a copolymer based on oxyalkylenealkylglycol-alkylene ethers and unsaturated dicarboxylic acid derivative comprising

a) from about 10 to about 90 mol% of structural groups of the formula Ia and/or Ib

-CH — CH — CH—CH—CH—CH—COM_a COX CO CO

where

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M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

 $/ \sim \frac{1}{h} \mathbf{x}$

 $-OM_a$ or $-O-(C_mH_{lm}O)_n-(C_mH_{lm}O)_o-R^1$,

where

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 R^1 = is H, an aliphatic hydrocarbon radical; a cycloaliphatic hydrocarbon;

an aryl radical which is unsubstituted or substituted.

l = 1 or 2,

m = 2 to 18,

the index on the hydrogen atom being formed by the product of l and m, and

n = 0 to 100, and

o = 0 to 100,

or.

- NHR² and/or - NR²₂ where

$$R^2 = R^1$$
 or -CO-NH₂ and also

$$-Q^1N - Q^2 - NQ^3Q^4$$
, where

_____Q¹ is a hydrogen atom or a monovalent hydrocarbon radical;

Q² is a divalent alkylene radical;

 \boldsymbol{Q}^3 and \boldsymbol{Q}^4 are aliphatic and/or alicyclic alkyl radicals, and

unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$,

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) Y

 $Y = O, NR^2, R^2$ being as defined above, or $N-Q^2-NQ^3Q^4$,

where

Q², Q³ and Q⁴ being as defined above,

b) from about 1 to about 89 mol% of structural groups of the formula IIa or IIb

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 $-CH_2 - CR^3 -$

$$(CH_2)_p - O - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o - R^1$$

IIa

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$$-CH_2 - CR^3 -$$

$$|$$

$$O - ((CH_2)_q - O)_t - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o-R^1$$

Πb

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in which

 $R^3 = H$, aliphatic hydrocarbon radical,

$$p = 0 \text{ to } 3$$
,

$$q = 0 \text{ to } 6, t = 0 \text{ to } 3, \text{ and }$$

R¹ and l, m, n and o are as defined above,

c) about 0.1 to about 10 mol% structural groups of the formula IIIa or IIIb

10 IIIa IIIb

where

$$R^4 = H, CH_3$$

 $S = -H, -COOM_a, -COOR^5$ $where R^5 = aliphatic hydrocarbon radical;$ cycloaliphatic hydrocarbon radical; aryl radical.

$$T = -U^{1} - O - (C_{m}H_{lm}O)_{n} - (C_{m}H_{lm}O)_{o} - R^{6}$$
 where $l = 1$ or 2 , $m = 2$ to 18 , and
$$n = 0$$
 to 100 and $o = 0$ to 100 ,
$$U^{1} = -CO - NH -, -O -, -CH_{2}O -,$$

$$R^6 = R^1$$
, $-CH_2 - CH - U^2 - C = CH$

$$R^4 R^4 S$$

where
$$U^2 = -NH - CO_{-}, -O_{-}, -OCH_2, -W - R^7$$
, where

$$W = \begin{bmatrix} CH_3 \\ Si - O \\ CH_3 \end{bmatrix} \xrightarrow{CH_3} CH_3$$

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$$r = 2 \text{ to } 100$$

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$$R^7 = R^1$$
,
 $- \left[(CH_2)_3 - NH \right]_S^- CO - C = CH$
 $- (CH_2)_2^- O - CO - C = CH$
 $R^4 S$

s = 1 or 2

$$z = 0 \text{ to } 4$$
,

$$-\text{CO-}\left[\text{NH-}(\text{CH}_2)_3\right]_{\text{s}}^{\text{--}}\text{W-R}^7$$

 $-CO-O-(CH_2)_Z-W-R^7$

$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1$$
, where
$$V = -O - CO - C_6H_4 - CO - O - or - W -,$$

 $-COOR^{5}$ in the case of $S = -COOR^{5}$ or $COOM_{a}$,

and

$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above;

- -- water;
- -- optionally a co-solvent; and
- -- optionally an auxiliary.
- 11. The aqueous pigment concentrate according to claim 10, wherein a co solvent is present and it is a glycol ester or a glycol ester.
- 12. The aqueous pigment concentrate according to claim 10, wherein the copolymer based on oxyalkylenealkylglycol-alkylene and unsaturated dicarboxylic acid derivative comprises:
 - a) from 10 to 90 mol% of structural groups of the formula Ia and/or Ib

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where

M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

 $X = -OM_a \text{ or } -O-(C_mH_{lm}O)_n-(C_mH_{lm}O)_o-R^1,$ where

| $R^1 =$ | is H, an aliphatic hydrocarbon radical having 1 to 20 carbon atoms, | | |
|---------|---|--|--|
| | a cycloaliphatic hydrocarbon having 5 to 8 carbon atoms, an aryl | | |
| | radical having 6 to 14 carbon atoms which is unsubstituted or | | |
| | substituted, | | |

| | | radical naving 6 to 14 carbon atoms which is unsubstituted of |
|-------------------|----|--|
| | | substituted, |
| | 5 | l= 1 or 2, |
| | | m = 2 to 18, |
| | | the index on the hydrogen atom being formed by the product of l and m, and |
| | | n = 0 to 100, and |
| | | o = 0 to 100, |
| <u>D</u> | 10 | |
| 13 | | $-NHR^2$ and/or $-NR_2^2$ where |
| 1.4 1.4 1.5 | | $R^2 = R^1$ or -CO-NH ₂ and also |
| 131 121 = | | |
| | | $-Q^1N-Q^2-NQ^3Q^4$, where |
| | 15 | Q ¹ is a hydrogen atom or a monovalent hydrocarbon radical |
| | | having 1 to 24 carbon atoms, |
| | | Q ² is a divalent alkylene radical having 2 to 24 carbon atoms, |
| | | Q ³ and Q ⁴ are aliphatic and/or alicyclic |
| | | alkyl radicals having 1 to 12 carbon atoms, and |
| | 20 | unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$, |
| | | |
| | | $Y = O, NR^2, R^2$ being as defined above, or $N-Q^2-NQ^3$ |
| | | where |
| | | Q^4 , Q^2 , Q^3 and Q^4 being as defined above, |
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b) from 1 to 89 mol% of structural groups of the formula IIa or Iib

$$_{2}$$
 - $_{CR^{3}}$ - $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$ $_{|}$

5 —CH₂ — CR³ —

 $O - ((CH_2)_q - O)_t - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o - R^1$

Пb

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in which

R³ = H, aliphatic hydrocarbon radical having 1 to 5 carbon atoms,

p = 0 to 3,

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q = 0 to 6, t = 0 to 3, and

R¹ and l, m, n and o are as defined above,

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c) 0.1 to 10 mol% structural groups of the formula IIIa or IIIb

Ша

Шb

where

$$R^4 = H, CH_3$$

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$$S = -H, -COOM_a, -COOR^5$$

where $R^5 =$ aliphatic hydrocarbon radical having 3 to 20 carbon atoms, cycloaliphatic hydrocarbon radical having 5 to 8 carbon atoms, aryl radical having 6 to 14 carbon atoms

$$T = -U^{1}-O-(C_{m}H_{lm}O)_{n}-(C_{m}H_{lm}O)_{o}-R^{6}$$
 where $l = 1$ or 2 , $m = 2$ to 18 , and
$$n = 0$$
 to 100 and $o = 0$ to 100 ,
$$U^{1} = -CO-NH-, -O-, -CH_{2}O-,$$

$$R^6 = R^1$$
, $-CH_2 - CH - U^2 - C = CH$
 $R^4 R^4 S$

where $U^2 = -NH - CO_{-}, -O_{-}, -OCH_2, -W - R^7$, where

$$W = \begin{bmatrix} CH_3 \\ I \\ Si - O \\ CH_3 \end{bmatrix} \begin{bmatrix} CH_3 \\ I \\ Si - CH_3 \end{bmatrix}$$

r = 2 to 100

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$$R^{7} = R^{1},$$

$$-\left[(CH_{2})_{3} - NH\right] - CO - C = CH$$

$$R^{4} S$$

$$-\left((CH_{2})_{2} - O - CO - C = CH\right)$$

$$R^{4} S$$

$$s = 1 \text{ or } 2$$

 $z = 0 \text{ to } 4$,
 $-CO - \left[NH - (CH_2)_3 \right]_s - W - R^7$

$$-CO-O-(CH_2)_Z-W-R^{7}$$

$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1$$
, where
 $V = -O - CO - C_6H_4 - CO - O - or - W -$,

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$$-COOR^5$$
 in the case of $S = -COOR^5$ or $COOM_a$,

and

$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above.

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- 13. The aqueous pigment concentrate according to claim 10, which contains about 0.1 to about 200 % by weight of copolymers, based on the amount of pigment.
- 14. The aqueous pigment concentrate according to claim 10, wherein the pigment is an inorganic pigment.
- 20 15. The aqueous pigment concentrate according to claim 14, wherein the pigment is an iron oxide.
 - 16. The aqueous pigment concentrate according to claim 14, wherein the pigment is a transparent iron oxide.
- 17. A coating system which comprises an aqueous pigment concentrate according to claim 10 and an aqueous coating material.

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- 18. The coating system according to claim 17, wherein the coating material is a one-component coating material which is based on alkyl, acrylate, epoxy, polyvinyl acetate, polyester or polyurethane resins.
- 19. The coating system according to claim 17, wherein the coating material is two-component coating material based on hydroxyl-containing polyacrylate or polyester-resins with melamine resins or optionally blocked polyisocyanate resins as cross linkers, or polyepoxide resins.
 - 20. A pigment concentrate which comprises
 - -- a pigment;
 - -- a copolymer based upon oxyalkylenealkylglycol-alkylene ethers and unsaturated dicarboxylic acid derivatives comprising:
- a) from about 10 to about 90 mol% of structural groups of the formula Ia and/or Ib

Ia.

Ιb

where

- M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,
- a = 1 or, if M is a divalent metal cation, is 1/2,

 $X = -OM_a \text{ or } -O-(C_m H_{lm} O)_n - (C_m H_{lm} O)_o - R^1,$

where



 R^1 = is H, an aliphatic hydrocarbon radical, a cycloaliphatic hydrocarbon, an aryl radical which is unsubstituted or substituted,

l = 1 or 2,

m = 2 to 18,

5 the index on the hydrogen atom being formed by the product of 1 and m, and

n = 0 to 100, and

o = 0 to 100,

 $-NHR^2$ and/or $-NR^2$ 2 where

 $R^2 = R^1$ or -CO-NH₂ and also

 $-Q^{1}N - Q^{2} - NQ^{3}Q^{4}$, where

Q¹ is a hydrogen atom or a monovalent hydrocarbon radical;

Q² is a divalent alkylene radical;

 \boldsymbol{Q}^{3} and \boldsymbol{Q}^{4} are aliphatic and/or alicyclic alkyl radicals; and

unoxidized or oxidized to $-Q^1N - Q^2 - N(+)O(-)Q^3Q^4$,

Y = Q, NR^2 , R^2 being as defined above, or $N-Q^2-NQ^3Q^4$,

where

Q², Q³ and Q⁴ being as defined above,

b) from about 1 to about 89 mol% of structural groups of the formula IIa or IIb

$$-CH_2 - CR^3 -$$

$$| (CH_2)_p - O - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o - R^1$$

IIa

$$-CH_2 - CR^3 -$$

$$|$$

$$O - ((CH_2)_q - O)_t - (C_mH_{lm}O)_n - (C_mH_{lm}O)_o-R^1$$

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Πb

in which

 $R^3 = H$, aliphatic hydrocarbon radical,

$$p = 0 \text{ to } 3,$$

q = 0 to 6, t = 0 to 3, and

R¹ and l, m, n and o are as defined above,

c) about 0.1 to about 10 mol% structural groups of the formula IIIa or IIIb

Ша

Шb

15 where

$$R^4 = H, CH_3$$

$$S = -H, -COOM_a, -COOR^5$$

where $R^5 =$ aliphatic hydrocarbon radical,

cycloaliphatic hydrocarbon radical,

20 aryl radical

$$T = -U^{1}-O-(C_{m}H_{lm}O)_{n}-(C_{m}H_{lm}O)_{o}-R^{6}$$

where $l = 1$ or 2, $m = 2$ to 18, and

n = 0 to 100 and o = 0 to 100,

$$U^{1} = -CO - NH_{-}, -O_{-}, -CH_{2}O_{-},$$

$$R^6 = R^1$$
, $-CH_2 - CH - U^2 - C = CH$

1.

R⁴ R⁴ S

where $U^2 = -NH - CO_{-}, -O_{-}, -OCH_{2}, -W - R^7$, where

$$\begin{bmatrix}
CH_3 \\
Si-O \\
CH_3
\end{bmatrix}$$

$$CH_3 \\
CH_3$$

$$CH_3$$

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$$r = 2 \text{ to } 100$$

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$$R^7 = R^1$$
,
 $-[(CH_2)_3 - NH]_{S}^{-} CO - C = CH$
 $-[(CH_2)_2 - O - CO - C = CH]_{R^4}^{-} S$

s = 1 or 2

$$z = 0 \text{ to } 4$$
,

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$$-\text{CO-}[\text{NH-}(\text{CH}_2)_3]_s - \text{W-R}^7$$

$$- \, CO - O - (CH_2)_{\!Z} - W - R^7$$

$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1$$
, where
$$V = -O - CO - C_6H_4 - CO - O - or - W -,$$

and

$$V = -O - CO - C_6H_4 - CO - O - or - W$$
,

the ligands and indices each being as defined above;

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-- optionally, at least one solvent,

- -- optionally, an auxiliary.
- 21. A method for improving the resistance of a paint to weathering which comprises adding a pigment concentrate according to claim 20 to the paint.

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- 22. The pigment concentrate according to claim 20, which further comprises a water-dispensable polymer, which is a polyacylate, polyurethane, or a polysiloxane.
 - 23. An aqueous pigment concentrate comprising:
 - -- a pigment;

-- a copolymer obtained by polymerizing oxyalkyleneglycol-alkenyl ether monomers and unsaturated dicarboxylic acid derivatives comprising:

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a) from about 10 to about 90 mol% of structural groups of the formula

Ia and/or Ib

CO CC

20

I a

Ιb

where

M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

$$X = -OM_a \text{ or } -O-(C_mH_{lm}O)_n-(C_mH_{lm}O)_o-R^1,$$

where ·

R¹ = is H, an aliphatic hydrocarbon radical a cycloaliphatic hydrocarbon, an aryl radical

-5----which-is-unsubstituted-or substituted,

$$l = 1 \text{ or } 2$$
,

$$m = 2 \text{ to } 18,$$

the index on the hydrogen atom being formed by the product of l and m, and

$$n = 0$$
 to 100, and

10 o = 0 to 100,

$$-NHR^2$$
 and/or $-NR^2$ where

$$R^2 = R^1$$
 or -CO-NH, and also

$$-Q^{1}N - Q^{2} - NQ^{3}Q^{4}$$
, where

Q¹ is a hydrogen atom or a monovalent hydrocarbon radical;

Q² is a divalent alkylene radical;

Q³ and Q⁴ are aliphatic and/or alicyclic

alkyl radicals; and

unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$,

 $Y = O, NR^2, R^2$ being as defined above, or $N-Q^2-NQ^3Q^4$,

20 where

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Q², Q³ and Q⁴ being as defined above,

b) from about 1 to about 89 mol% of structural groups of the formula IIa or IIb

$$-CH_{2} - CR^{3} -$$

$$| (CH_{2})_{p} - O - (C_{m}H_{1m}O)_{n} - (C_{m}H_{1m}O)_{o}-R^{1}$$

$$| IIa$$

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IIb

in which

H, aliphatic hydrocarbon radical,

0 to 3, p =

0 to 6, t = 0 to 3, andq =

R¹ and l, m, n and o are as defined above,

c) about 0.1 to about 10 mol% structural groups of the formula IIIa or

Шb

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Ша

Шb

where

$$R^4 = H, CH_3$$

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$$S = -H, -COOM_a, -COOR^5$$

where $R^5 =$ aliphatic hydrocarbon radical;

cycloaliphatic hydrocarbon radical;

aryl radical.

$$\underline{T} = \underline{U^{1}} - O - (C_{m}H_{lm}O)_{n} - (C_{m}H_{lm}O)_{o} - R^{6}$$

where l = 1 or 2, m = 2 to 18, and

n = 0 to 100 and o = 0 to 100,

$$U^{1} = -CO - NH -, -O -, -CH_{2}O -,$$
 $R^{6} = R^{1}, -CH_{2} - CH - U^{2} - C = CH$

| | |

where
$$U^2 = -NH - CO_{-}, -O_{-}, -OCH_2, -W-R^7,$$

where

$$W = \begin{bmatrix} CH_3 \\ Si - O \\ CH_3 \end{bmatrix} \begin{bmatrix} CH_3 \\ Si - \\ CH_3 \end{bmatrix}$$

r = 2 to 100

$$R^7 = R^1$$
,
 $-\left[(CH_2)_3 - NH \right]_S - CO - C = CH$
 $R^4 S$
 $- (CH_2)_2 - O - CO - C = CH$
 $R^4 S$

s = 1 or 2

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$$z = 0 \text{ to } 4,$$

-CO- $\left[\text{NH-(CH}_2)_3 \right]_s$ W- R⁷

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$$-CO-O-(CH_2)_z-W-R^7$$

$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1$$
, where
$$V = -O - CO - C_6H_4 - CO - O - or - W -,$$

 $-COOR^{5} \text{ in the case of S} = -COOR^{5} \text{ or COOM}_{a},$

and

$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above

wherein the polymerization occurs in aqueous solution at a temperature of from about 20 to about 100°C in the presence of a free-radical initiator.

- -- water;
- -- optionally, a co-solvent; and
- -- optionally, an auxiliary.
- 24. A process for dispensing a pigment for a paint, printing ink or pigment paste which comprises adding to the pigment a co-polymer obtained by polymerizing oxyalkyleneglycol-alkylenyl ether and unsaturated dicarboxylic acid derivatives comprising:
 - a) from about 10 to about 90 mol% of structural groups of the formula

 Ia and/or Ib

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Ib

where

M = hydrogen, monovalent or divalent metal cation, ammonium ion, organic amine '

I a

5 radical,

a = 1 or, if M is a divalent metal cation, is 1/2,

 $X = -OM_a \text{ or } -O-(C_m H_{lm}O)_n - (C_m H_{lm}O)_o - R^1$,

where

R¹ = is H, an aliphatic hydrocarbon radical a cycloaliphatic hydrocarbon, an aryl radical

which is unsubstituted or substituted,

l = 1 or 2,

m = 2 to 18,

the index on the hydrogen atom being formed by the product of l and m, and

n = 0 to 100, and

0 = 0 to 100,

 $-NHR^2$ and/or $-NR^2$ 2 where

$$R^2 = R^1$$
 or -CO-NH₂ and also

 $-Q^{1}N - Q^{2} - NQ^{3}Q^{4}$, where

Q¹ is a hydrogen atom or a monovalent hydrocarbon radical;

Q² is a divalent alkylene radical;

Q³ and Q⁴ are aliphatic and/or alicyclic

alkyl radicals; and

unoxidized or oxidized to $-Q^1N - Q^2 - N^{(+)}O^{(-)}Q^3Q^4$,

 $Y = O, NR^2, R^2$ being as defined above, or $N-Q^2-NQ^3Q^4$,

where

Q², Q³ and Q⁴ being as defined above,

b) from about 1 to about 89 mol% of structural groups of the formula IIa or IIb

$$-CH_{2} - CR^{3} - CH_{2} - CR^{3} - CH_{2} - CH_{2} - CR^{3} - CH_{2} -$$

IIa

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$$-CH_{2} - CR^{3} -$$

$$| \\ O - ((CH_{2})_{q} - O)_{t} - (C_{m}H_{lm}O)_{n} - (C_{m}H_{lm}O)_{o}-R^{1}$$

$$IIb$$

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in which

 $R^3 = H$, aliphatic hydrocarbon radical,

p = 0 to 3,

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q = 0 to 6, t = 0 to 3, and

R1 and l, m, n and o are as defined above,

c) about 0.1 to about 10 mol% structural groups of the formula IIIa or IIIb

Ша

where

$$R^4 = H, CH_3$$

$$S = -H, -COOM_a, -COOR^5$$

where $R^5 =$ aliphatic hydrocarbon radical;

cycloaliphatic hydrocarbon radical;

aryl radical,

CORPARA CHOSOL

$$T = -U^{1} - O - (C_{m}H_{lm}O)_{n} - (C_{m}H_{lm}O)_{o} - R^{6}$$

where l = 1 or 2, m = 2 to 18, and

n = 0 to 100 and o = 0 to 100,

$$U^1 = -CO - NH_{-}, -O_{-}, -CH_2O_{-},$$

$$R^6 = R^1$$
, $-CH_2 - CH - U^2 - C = CH$

$$R^4 \qquad R^4 \qquad S$$

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$$R^4$$
 R^4 S

where $U^2 = -NH - CO_{-}, -O_{-}, -OCH_2, -W-R^7$

where

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$$W = \begin{bmatrix} CH_3 \\ Si - O \\ CH_3 \\ CH_3 \end{bmatrix}_r CH_2$$

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$$s = 1 \text{ or } 2$$

$$z = 0 \text{ to } 4$$
,

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$$-\text{CO-}[\text{NH-}(\text{CH}_2)_3]_s - \text{W-R}^7$$

$$-CO - O - (CH_2)_z - W - R^7$$

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$$-(CH_2)_Z - V - (CH_2)_Z - CH = CH - R^1, \text{ where}$$

$$V = -O - CO - C_6H_4 - CO - O - \text{or} - W -,$$

$$-COOR^{5}$$
 in the case of $S = -COOR^{5}$ or $COOM_{a}$,

and

$$V = -O - CO - C_6H_4 - CO - O - or - W,$$

the ligands and indices each being as defined above

wherein the polymerization occurs in aqueous solution at a temperature of from about 20°C to about 100°C in the presence of a free-radical initiator.

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